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Quality of western Canadian peas

2016

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Canada

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Introduction

This report presents quality data for 2016 western Canadian peas from Canadian Grain Commission's Harvest Sample Program. Samples were submitted by western Canadian producers to the Canadian Grain Commission's Grain Research Laboratory for analysis.

Production

Pea production for 2016 was estimated to be 4.8 million tonnes, which was up approximately 50% from 2015 and 55% higher than the 10-year average of 3.1 million tonnes (Table 1). The increase in production was the result of 14% increase in harvested area and 32% increase in yield from 2015. Saskatchewan accounted for 49.1% of Canadian pea production, while Alberta accounted for 47.5% and Manitoba accounted for 3.4

Table 1 – Production statistics for western Canadian peas[1]

	Harvested area		Production		Yield		Mean production
Province	2016	2015	2016	2015	2016	2015	2006–2015
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Peas							
Manitoba	65	27	164	78	2500	2900	75
Saskatchewan	870	856	2346	1779	2700	2100	2132
Alberta[2]	732	575	2271	1315	3100	2300	938
Western Canada	**1667**	**1458**	**4782**	**3171**	**2900**	**2200**	**3144**

[1]Statistics Canada.
[2]Includes the Peace River area of British Columbia.

Western Canadian peas 2016

Pea samples

Samples for the Canadian Grain Commission's Harvest Sample Program were collected from producers across western Canada (Figure 1). The Canadian Grain Commission received 569 pea samples consisting of 468 yellow pea samples and 101 green pea samples. All samples were graded and tested for protein content. Composite samples were prepared based on class (yellow and green), crop region and grade (No. 1 and No. 2). All composites were tested for chemical composition (moisture, protein, starch, total dietary fiber and ash content), mineral content, functional properties (water holding capacity and emulsifying capacity), and physical and cooking characteristics (100-seed weight, water absorption, cooking time and firmness of cooked peas). It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 1 – Map of western Canada showing origin of 2016 pea samples from CGC's Harvest Sample Program

Quality of 2016 western Canadian peas

Protein content for yellow and green peas ranged from 14.2% to 28.1% (Table 2). The mean protein content for western Canadian peas was 22.1%, which was close to the mean of 22.2% for 2015, but lower than the ten-year mean protein content of 23.2 (Figure 2). Table 3 represents the mean protein and starch content for yellow and green peas by crop region (Figure 3).

Table 4 shows the quality data for 2016 yellow peas. Mean protein content for No. 1 Canada Yellow peas was 21.5%, which was lower than the mean for 2015 (21.9%). Mean protein content for No. 2 Canada Yellow peas was 21.7%, which was lower than the mean for 2015 (22.2%). Mean starch content for No. 1 Canada Yellow peas was 48.9%, slightly higher than the mean for No. 1 Canada Yellow peas in 2015 (48.6%). The mean starch content for No. 2 Canada was 48.5%, similar to the mean for 2015. Mean total dietary fiber content for No.1 Canada Yellow peas was 16.6%, higher than the mean for No.1 Canada Yellow peas for 2015. Mean total dietary fiber for No. 2 Canada Yellow peas was 16.5% higher than the mean for No. 2 in 2015. Mean ash contents in both grades were similar to that for 2015. Potassium (K) was the most abundant macroelement present in yellow peas, followed by phosphorus (P), magnesium (Mg) and calcium (Ca) (Table 4). Among microelements, iron (Fe) was the highest, followed by zinc (Zn), manganese (Mn), and copper (Cu). Mean water holding capacity for No. 1 Canada Yellow peas was 0.92 g H_2O per g sample, which was similar to the mean value for 2015 (Table 4). Mean water hydration capacity for No. 2 Canada Yellow was 0.94 g H_2O per g sample, which was higher than the mean value for 2015. The emulsifying capacity of No. 1 Canada Yellow peas was 275.5 mL oil per g sample, which was higher than that for 2015. The emulsifying capacity of No. 2 Canada Yellow peas was 270.5 mL oil per g sample, which was slightly lower than the emulsifying capacity for 2015

Mean 100-seed weight for No. 1 Canada Yellow peas was 21.0 g (Table 4), while mean 100-seed weight for No. 2 Canada Yellow peas was 20.8 g. Mean 100-seed weights for both grades of peas were lower than those for 2015. The water absorption value for No. 1 Canada Yellow peas was 0.86 g H_2O per g seeds. For No. 2 Canada Yellow peas, the water absorption value was 0.87 g H_2O per g seeds. Water absorption values for both grades were similar to 2015 values.

Cooking times for No. 1 and No. 2 Canada Yellow peas were shorter than those for 2015 (Table 4). For both No. 1 and No. 2 grades, mean firmness values of cooked peas were lower than values in 2015.

Table 5 shows the 2015 quality data for No. 1 Canada and No. 2 Canada Green peas. Mean protein content for No. 1 Canada Green peas was 21.9%, which was higher than the mean for 2015. Mean protein content for No. 2 Canada Green peas was 22.7%, which was lower than the mean for 2015. Mean starch content was 47.9% for No. 1 Canada Green peas,

slightly higher than the mean for 2015, and 47.6% for No. 2 Canada Green peas, similar to the mean for 2015. Mean total dietary fiber content for No. 1 Canada Green peas was 17.7%, higher than the mean for No. 1 Canada Green peas (16.0%) for 2015. Mean total dietary fiber content for No. 2 Canada Green pea was 17.1%, higher than that for No. 2 Canada Green pea for 2015. Ash content values for No. 1 and No. 2 Canada Green peas were similar to values in 2015. Similar trends to yellow peas for both macroelements and microelements in green peas were noted (Table 5). Mean water holding capacity for No. 1 Canada Green peas (0.96 g H_2O per g sample) was similar to the mean for No. 2 Canada Green peas (0.93 g H_2O per g sample) (Table 5). The means for both grades were higher than the means for 2015. Mean emulsifying capacity was 279.6 mL oil per g sample for No. 1 Canada Green peas and 273.9 mL oil per g sample for No. 2 Canada Green peas. The means for both grades were higher than the means for 2015.

Mean 100-seed weight for No. 1 Canada Green peas was 20.7 g, similar to 2015 (Table 5). Mean 100-seed weight for No. 2 Canada Green peas was 20.9 g, lower than that for 2015. Mean water absorption values for No. 1 and No. 2 Canada Green peas were similar to 2015. Mean cooking time for No. 1 Canada Green peas was 12.0 min and was 13.8 min for No. 2 Canada Green peas. Mean firmness values for cooked green peas for both grades were slightly lower than values for 2015.

Table 2 – Mean protein content for 2016 western Canadian peas (yellow and green combined) by grade[1]

Grade	Protein content, % dry basis			
	2016			2015
	Mean	Min.	Max.	Mean
Manitoba				
Peas, No. 1 Canada	22.6	18.5	25.9	22.6
Peas, No. 2 Canada	23.5	20.3	25.6	22.5
Peas, No. 3 Canada	24.5	22.7	26.4	22.9
All grades	**23.6**	**18.5**	**26.4**	**22.6**
Saskatchewan				
Peas, No. 1 Canada	21.7	18.4	25.1	21.9
Peas, No. 2 Canada	22.1	17.8	28.1	22.3
Peas, No. 3 Canada	22.8	17.6	27.3	22.4
All grades	**22.1**	**17.6**	**28.1**	**22.3**
Alberta				
Peas, No. 1 Canada	20.9	16.4	24.2	21.6
Peas, No. 2 Canada	21.7	14.2	26.1	22.1
Peas, No. 3 Canada	22.5	18.3	25.5	21.9
All grades	**21.8**	**14.2**	**26.1**	**22.0**
Western Canada				
Peas, No. 1 Canada	21.5	16.4	25.9	21.8
Peas, No. 2 Canada	22.0	14.2	28.1	22.3
Peas, No. 3 Canada	22.8	17.6	27.3	22.2
All grades	**22.1**	**14.2**	**28.1**	**22.2**

[1]Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 2 – Mean protein content of western Canadian peas

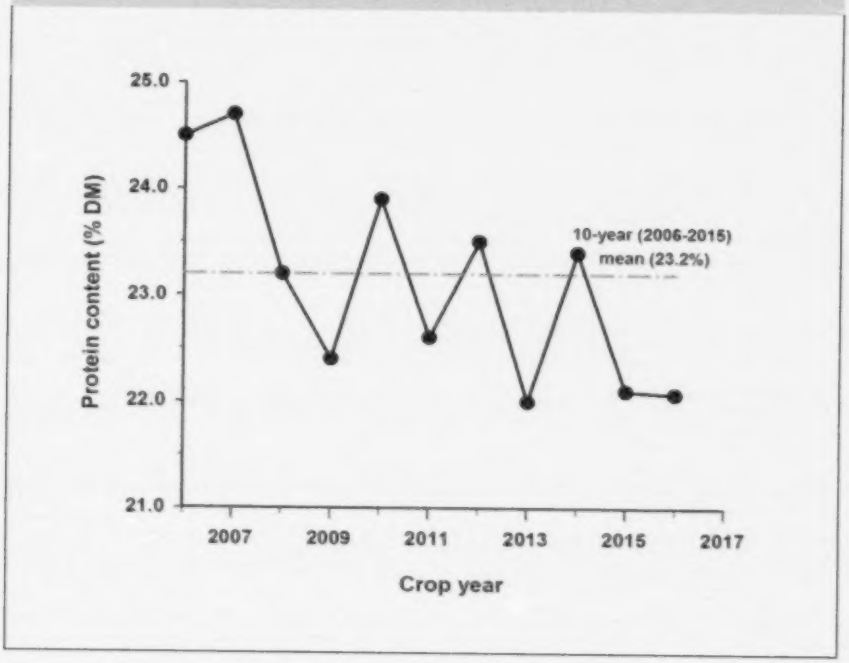

Figure 3 – Crop regions in western Canada

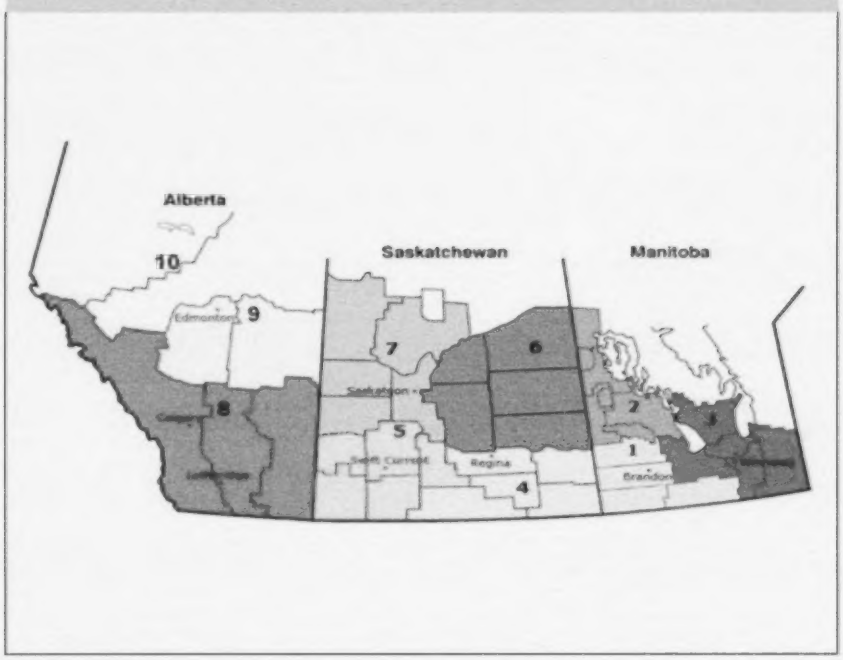

Table 3 – Mean protein and starch content for 2016 western Canadian peas (yellow and green combined) by crop region

	Protein content, % dry basis		Starch content, % dry basis	
Crop region[1]	2016	2015	2016	2015
1	22.9	22.8	47.9	48.1
2	21.1	NS[2]	47.7	NS
3	NS	NS	NS	NS
4	21.8	22.1	48.0	48.4
5	21.0	22.8	48.5	48.1
6	22.1	22.4	47.6	47.4
7	22.2	22.3	47.4	47.3
8	21.0	21.4	49.7	49.1
9	22.2	22.9	46.0	49.0
10	22.4	21.8	48.6	48.5

[1]Manitoba crop regions (Figure 3): 1 (Southwest Manitoba); 2 (Northwest Manitoba); 3 (Eastern Manitoba); Saskatchewan crop regions: 4 (South East Saskatchewan), 5 (South West Saskatchewan), 6 (North East Saskatchewan), and 7 (North West Saskatchewan); Alberta crop regions: 8 (Southern Alberta), 9 (Central Alberta), and 10 (Northern Alberta).

[2]NS= insufficient number of samples to generate a representative value.

Table 4 – Quality data for 2016 western Canadian yellow pea composite by grade

	Peas, No. 1 Canada Yellow		Peas, No. 2 Canada Yellow	
Quality parameter	2016	2015	2016	2015
Chemical composition				
Moisture content, %	10.6	10.2	10.4	10.2
Protein content, % dry basis	21.5	21.9	21.7	22.2
Starch content, % dry basis	48.9	48.6	48.5	48.6
Total dietary fiber, % dry basis	16.6	14.9	16.5	15.5
Ash content, % dry basis	2.8	2.8	2.9	3.0
Mineral (mg/100 g dry basis)				
Calcium (Ca)	79.5	90.7	85.7	96.6
Copper (Cu)	0.71	0.73	0.74	0.75
Iron (Fe)	5.1	5.2	5.5	5.5
Potassium (K)	1037.5	1082.1	1082.6	994.8
Magnesium (Mg)	138.4	145.9	138.7	149.2
Manganese (Mn)	1.3	1.4	1.4	1.3
Phosphorus (P)	342.5	373.7	384.9	354.5
Zinc (Zn)	3.4	3.9	3.6	3.8
Functional property				
Water holding capacity, g H_2O/g sample	0.92	0.90	0.94	0.87
Emulsifying capacity, mL oil/g sample	275.5	267.0	270.5	276.3
Physical characteristic				
100-seed weight, g/100 seeds	21.0	21.8	20.8	22.0
Water absorption, g H_2O/g seeds	0.86	0.86	0.87	0.88
Cooking characteristic				
Cooking time, min	15.0	24.7	11.4	21.0
Firmness, N/g cooked seeds	22.8	26.2	22.8	25.6

Table 5 – Quality data for 2016 western Canadian green pea composite by grade

	Peas, No. 1 Canada Green		Peas, No. 2 Canada Green	
Quality parameter	2016	2015	2016	2015
Chemical composition				
Moisture content, %	10.8	10.4	10.8	10.7
Protein content, % dry basis	21.9	21.3	22.7	24.0
Starch content, % dry basis	47.9	48.5	47.6	47.6
Total dietary fiber, % dry basis	17.7	16.0	17.1	15.5
Ash content, % dry basis	2.9	2.7	3.0	2.9
Mineral (mg/100 g dry basis)				
Calcium (Ca)	77.2	89.1	80.0	90.6
Copper (Cu)	0.65	0.73	0.66	0.71
Iron (Fe)	4.9	5.0	5.5	5.2
Potassium (K)	1061.1	996.2	1063.5	937.9
Magnesium (Mg)	123.1	130.5	128.9	133.2
Manganese (Mn)	1.3	1.1	1.3	1.2
Phosphorus (P)	364.9	355.2	384.9	373.6
Zinc (Zn)	3.4	3.7	3.6	3.8
Functional property				
Water holding capacity, g H_2O/g sample	0.96	0.85	0.93	0.86
Emulsifying capacity, mL oil/g sample	279.6	264.8	273.9	264.5
Physical characteristic				
100-seed weight, g/100 seeds	20.7	21.0	20.9	23.6
Water absorption, g H_2O/g seeds	0.80	0.79	0.76	0.79
Cooking characteristic				
Cooking time, min	12.0	15.8	13.8	14.9
Firmness, N/g cooked seeds	23.2	25.4	22.4	25.1